REMARKS/ARGUMENT

Applicant responds herein to the Office Action dated July 30, 2002.

The specification and claims have been objected to or rejected on various grounds. Preliminarily, it is noted that this application is closely related to application serial no. 09/529,052, as recognized by the Examiner. Therefore, it will not be necessary to cross-file all of the prior art documents cited by the Examiner and/or by the applicant in each application, since the Examiner seems to be cognizant of the co-pendency of these two applications.

An Abstract of Disclosure that does not exceed 150 words has been requested. The same is provided herein. Further, claim 23 was rejected under 35 U.S.C. §112, first paragraph, and claims 1, 24, 26 and 27 have been rejected under the second paragraph of §112, all as set forth at paragraphs 3 and 4 of the Office Action.

The amendments to the claims herein are believed to fully address and remedy the points made by the Examiner and, accordingly, the noted objections/rejections under §112 should be reconsidered and withdrawn.

As pointed out in the related application, the originally filed dependent claim 2 recites "wherein the DC discharge is performed periodically in the form of on/off pulsing during a total processing time, in order to improve the hydrophilicity of the polymer". It is well established in the patent jurisprudence that the originally filed patent claims constitute part of the original disclosure and, therefore, there is, in fact, support in the application for the objected-to recitation in claim 23. Nonetheless, the applicant has opted to avoid the issue by removing the objected-to language, without prejudice to the representation thereof, if necessary or desired by the applicant.

Substantively, claims 1, 20, 21 and 25-28 stand rejected on the grounds of obviousness over Haque (4,598,022), in view of "applicant's admission". Claim 24 stands rejected on grounds of obviousness over the aforementioned references, further in view of Haque (4,588,641). Lastly, claim 29 is asserted to be obvious over the aforementioned Haque '022 reference, further in view of Kleeberg (5,089,290).

In addition to the above rejections on art, claims 1, 23-25, 28 and 29 are stated to be provisionally rejectable on grounds of obviousness-type double patenting, as set forth at paragraphs

9 and 10 of the subject Office Action. Reconsideration of these rejections is requested in view of the amendments to the claims herein and the following remarks.

Preliminarily, the applicant respectfully traverses and asks reconsideration of the rejection on grounds of provisional obvious-type double patenting. The claims in the cited application (as well as in several other applications) emanate from a single parent application, the claims of which were divided pursuant to a restriction requirement by the Examiner. The rationale justifying the restriction request is that the different claims relate to different inventions that are not either identical to one another (in which case there could not have been a request for restriction), or even obvious over one another. Similarly, with respect to the obviousness-type double patenting rejection herein, the Patent Office is estopped from asserting an obviousness-type double patenting rejection, in view of the previously issued restriction requirement.

Substantively, it is noted that in the instant claims, the metal is "surface processed" using a DC discharge plasma by plasma polymerization. In the process of the invention, there is obtained a plasma consisting of positive and negative ions and radicals generated from the unsaturated monomer gas to thereby form a polymer on the surface of the anode electrode by plasma deposition.

In other words, the surface that is processed is constituted as the anode electrode within the chamber.

In the primary '022 Haque reference cited by the Examiner, there is described a one-step plasma treatment for improving the laminate adhesion of metallic and non-metallic substrates. The polymeric films formed by this treatment are described as usable as a substrate material to protect the substrate material from the environment, moisture, chemical attack and mechanical damage.

As a first point, this reference does not teach a polymer film with hydrophilicity or hydrophobicity on a surface of a metal.

The primary cited reference discloses two electrodes (an anode and a cathode), both connected to an external power source and both located in the vacuum chamber in which the polymerization of the substrate material takes place. But the substrate material is not one of the electrodes. Rather, it is mounted on or placed near the cathode electrode, as described in Figure 1 of the reference.

In marked contrast, in the claimed invention, it is a metal that is being surface-modified by polymerization and it is that metal that forms the electrode, specifically the anode electrode. Therefore, the present invention discloses and claims the difference of polymerization between an anode and a cathode, as generally described in the specification at pp. 13-16.

Moreover, the claimed invention uses a DC power for plasma polymerization. Even though the reference discloses a power source that may either be any suitable conventional DC source or an AC source, the reference leads away from the invention, because it teaches that an AC source is preferred because films deposited from DC glow discharge systems are generally poor and difficult to reproduce (see the reference at column 4, lines 33-35).

The above remarks already constitute patentable distinctions between the claimed inventions and the cited art.

Moreover, the reference is silent as to the concentration of the non-polymerizable gas. At least one of the claims (claim 28) addresses this feature. The point is not at all addressed in the Office Action. But, in fact, in the present invention, the hydrophilicity of a metal substrate varies depending on the concentration of the non-polymerizable gas. This constitutes part of the recognition of a problem and a solution therefor by the present applicant. Therefore, this constitutes a feature that needs to be and was not treated in the Office Action and to the extent that it appears in any of the claims, those claims are patentable over the prior art.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on October 29, 2002

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Name of applicant, assignee or Registered Representative

Signature

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Respectfully submitted,

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APPENDIX B

VERSION WITH MARKINGS TO SHOW CHANGES MADE

37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

CLAIMS:

1. (AMENDED) A method for surface processing by plasma polymerization of a surface of a metal by using a DC discharge plasma, comprising the steps of:

(a) positioning an anode electrode which is substantially of metal to be surface-processed and a cathode electrode in a chamber;

(b) maintaining a pressure in the chamber at a predetermined vacuum level;

(c) blowing an unsaturated aliphatic hydrocarbon monomer gas or a fluorine-containing monomer gas at a predetermined pressure and a non-polymerizable gas at a predetermined pressure into the chamber; and

(d) applying a voltage to the electrodes in order to obtain a DC [discharge, whereby to obtain a] plasma consisting of positive and negative ions and radicals generated from the unsaturated aliphatic hydrocarbon monomer gas or the fluorine containing monomer gas and the non-polymerizable gas, and then forming a polymer with hydrophilicity or hydrophobicity on a [the] surface of the anode electrode by plasma deposition.

23. (AMENDED) The method for surface processing by plasma polymerization according to claim 1, wherein the DC discharge is performed periodically in the form of on/off pulsing during a total processing time[in order to improve the hydrophilicity of the polymer].

24. (AMENDED) The method for surface processing by plasma polymerization according to claim 1, wherein the polymer obtained in the step (d) is surface-processed by a plasma of at least one non-polymerizable gas selected from the [a] group consisting of O_2, N_2, CO_2, CO, H_2O and NH_3 gas in order to improve the hydrophilicity of the polymer.

26. (AMENDED) The method for surface processing by plasma polymerization according to claim 1, wherein the ratio of the unsaturated aliphatic hydrocarbon monomer gas and the non-polymerizable gas is varied [whereby] to vary the properties of the polymer.

ABSTRACT OF THE DISCLOSURE

There is provided a method for surface processing by plasma polymerization of a surface of a metal by using a DC discharge plasma, comprising the steps of: positioning an anode electrode which is substantially of metal to be surface-processed and a cathode electrode in a chamber; maintaining a pressure in the chamber at a predetermined vacuum level; blowing an unsaturated aliphatic hydrocarbon monomer gas or a fluorine-containing monomer gas at a predetermined pressure and a non-polymerizable gas at a predetermined pressure into the chamber; and applying a voltage to the electrodes in order to obtain a DC discharge plasma consisting of positive and negative ions and radicals generated from the unsaturated aliphatic hydrocarbon monomer gas or the fluorine containing monomer gas and the non-polymerizable gas, and then forming a polymer with hydrophilicity or hydrophobicity on the surface of the anode electrode by plasma deposition.

[According to the present invention, there is provided a method for surface processing by plasma polymerization of a surface of a metal by using a DC discharge plasma, comprising the steps of: positioning an anode electrode which is substantially of metal to be surface-processed and a cathode electrode in a chamber; maintaining a pressure in the chamber at a predetermined vacuum level; blowing an unsaturated aliphatic hydrocarbon monomer gas or a fluorine-containing monomer gas at a predetermined pressure and a non-polymerizable gas at a predetermined pressure into the chamber; and applying a voltage to the electrodes in order to obtain a DC discharge, whereby to obtain a plasma consisting of positive and negative ions and radicals generated from the unsaturated aliphatic hydrocarbon monomer gas or the fluorine containing monomer gas and the non-polymerizable gas, and then forming a polymer with hydrophilicity or hydrophobicity on the surface of the anode electrode by plasma deposition, and also provided a method for surface processing by plasma polymerization of a surface of a materials including a metal, a ceramic or a polymer by using an RF discharge plasma, comprising the steps of: positioning a passive electrode which is of the material to be surface-processed and an active electrode which is substantially of metal in a chamber; maintaining a pressure in the chamber at a predetermined vacuum level; blowing an unsaturated aliphatic hydrocarbon monomer gas or a fluorine-containing monomer gas at a predetermined pressure

and a non-polymerizable gas at a predetermined pressure into the chamber; and applying a voltage to the electrodes in order to obtain an RF discharge, whereby to obtain a plasma consisting of positive and negative ions and radicals generated from the unsaturated aliphatic hydrocarbon monomer gas or the fluorine containing monomer gas and the non-polymerizable gas, and then forming a polymer with hydrophilicity or hydrophobicity on the surface of the passive electrode by plasma deposition.]